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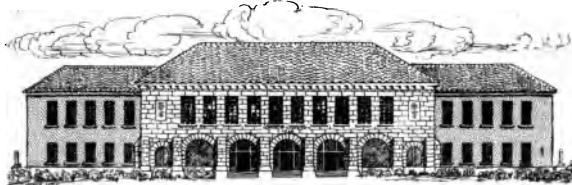
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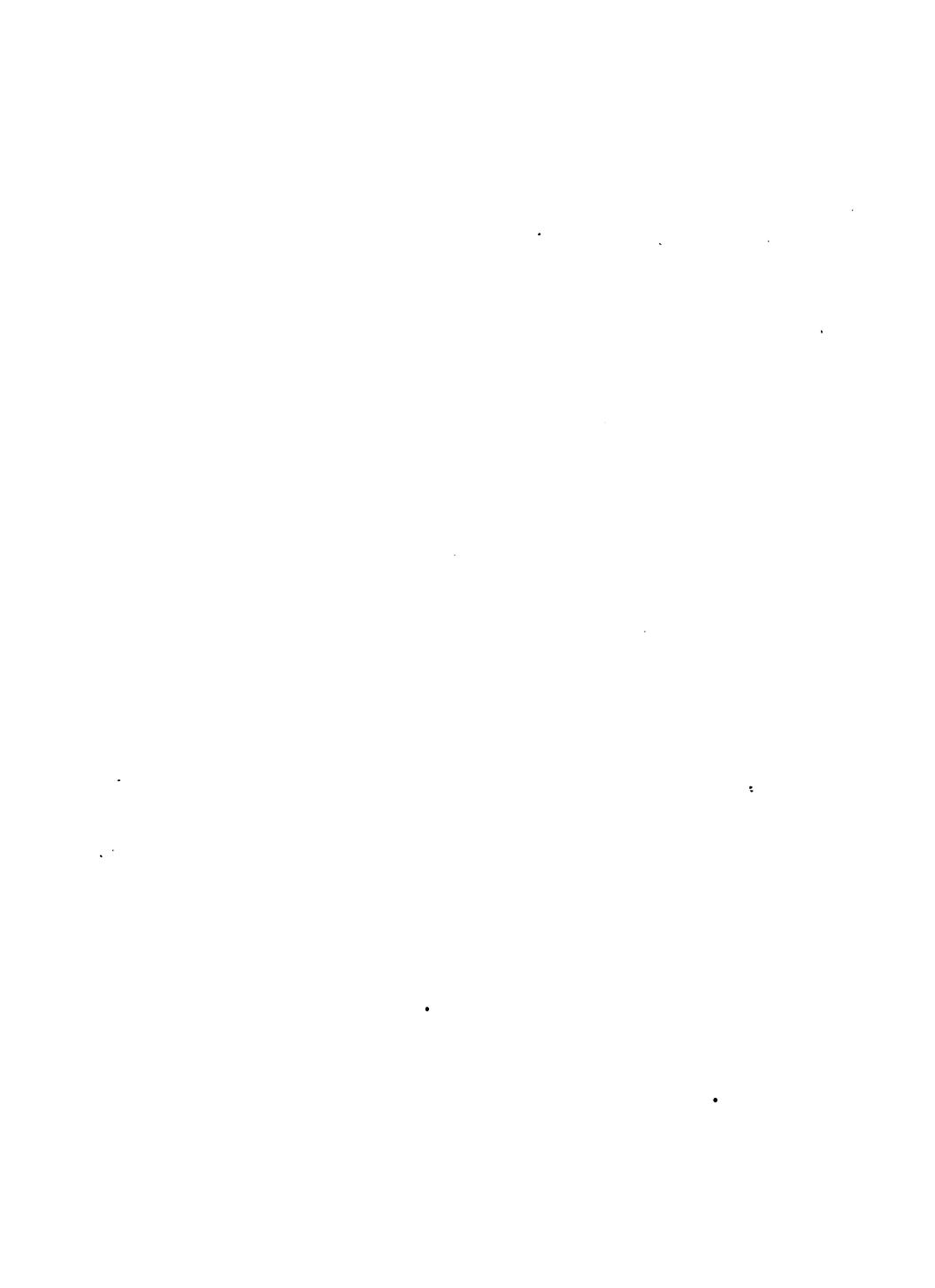


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OLD MOTHER EARTH:

HER

HIGH-WAYS AND BY-WAYS.

BY

JOSEPHINE SIMPSON.

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OLD MOTHER EARTH.

Her Highways and By-ways.

TALK I.

HER WRINKLED FACE.

WHAT a wrinkled, rough, old face is Mother Earth's!

"And well it may be," you are ready to exclaim, "for she is old, so very old."

That is all quite true, my boy, it is many thousand years since God set her a-spinning in the heavens, but really she was wrinkled, seamed, and scarred, almost from the beginning.

You have seen a freshly made pie, perhaps, all scorched, cracked and wrinkled? Why? Because the oven was very, very hot, and the slits cut in the dough were not sufficient to let out much of the heat within.

Now the crust of the Earth, you know, covers

a great, fiery, shifting sea of heated stuff always striving, more or less, to break through somewhere at the surface.

Then the atmosphere, the big ocean of air all around the Earth, presses down very hard upon it from the outside; and even each particle of the crust itself presses upon its tiny neighbor to the right or left, so you see there are strong servants at work.

So it is now, and in the beginning it is supposed these servants or forces worked with far more strength, so that the big round ball God set them a-making did not turn out smooth and even; but wrinkled here, and hollowed there, with backbones not always in the middle but rather running up and down on each side.

The long wrinkles, the backbones of the land masses, we call mountains, you know; and the hollows, plains or valleys.

Next, the sea went to work and helped fill in those spaces between the backbones or ridges of land, the first mountains; so that after awhile the big hollows or plains appeared.

Then the strong fire-servant beneath the surface would push up these hollows a little, and by-and-by great land masses could be seen, here and there, in the big sea that even now covers three-fourths of our globe.

Here and there did I say? That was hardly correct. Take the school-room globe, twirl it around several times. First look only at the land, next

at the water. Now compare the two. The greater portion of the land-mass is on the upper half, while most of the water lies on the lower half of the Earth.

Now look again. See how the land stretches around the North Pole in a big ring, broad at first, tapering more or less gradually, until finally down toward the Southern Hemisphere the various land-masses come to a pretty sharp point.

You notice that particularly when you have a map of South America or of Africa to draw.

By the way, when you make your map of South America, first of all you draw a triangle, don't you? After that there is little else to do really. Now look sharply at Africa. Why, that is a sort of triangle too; and so are Europe and Asia, when you take them together, as they are in fact.

Now we are getting on in our Physical Geography studies. We are looking at our Earth as a whole, a physical body.

We must not view Europe or Asia as different detached pictures, one on this page, the other on that; but simply as parts of the great land-mass, given particular names for our convenience at times.

Again—if after our brief talk you were to tell me glibly “a mountain is a high elevation of land,” I should be much disappointed. I don’t like set definitions, especially in the words of other folks. Now the work “wrinkle” is yours just as much as mine; you use it, don’t you?

When you tell me a mountain is a big wrinkle in the Earth's crust, and go on in a cosy little talk to say how it came to be, I take you for the real little scientist that you are.

Questions suggested by the text.—1. Can you give any reason why the earth's surface is so uneven ? 2. Can you think of another name for a mountain and why it should be so called? 3. How do we know that high land lay once at the bottom of the sea ? 4. London is located about in the centre of the land hemisphere ; what is a natural result of this central position ? 5. Where are the grand divisions the widest ?

TALK II.

TOILERS OF THE SEA.

IN our last talk we spoke of the mountains, the big wrinkles—how they were formed by the fierce fire-servant below the surface; the heavy-weight, pressing servant, the Atmosphere; and the pushing servant, the crust itself.

To-day I should like to talk to you about a countless army of servants, who, for ages past, have done a tremendous amount of work in building up great mountain fringes along the edges of the land in certain places.

These tiny creatures live in the Tropical Seas, mostly in the Pacific and Indian Oceans.

Oh, you mean the coral insect! Yes, but let us give it a better name.

An insect is an animal whose body is divided into three distinct parts. Now Mr. Coral is, of himself, not much more than stomach with a slit or mouth surrounded by many little waving

feet or tentacles as they are called. His proper surname therefore is Polyp which means many footed.

I assure you he is rightly named for those wee feet of his do a tremendous work kicking or rather fanning the sea-water towards his mouth.

Now this sea-water contains limestone which Mr. Polyp uses to build up his house or skeleton with. So you see he is kept pretty busy all the time; although he never, in his whole life, stirs a step from his home for all his many feet.

The old folks build a story, then lay down and die; the young folks build the next one higher, and by the time that is finished the babies are ready to begin; and so they work on, these busy stationary families, numbering millions, these wonderful "toilers of the sea."

For ages one family or colony after another works silently, unweariedly on at its unconscious task; and lo! the shining sun smiles down one day upon a glistening coral reef, just raising its dripping head above the rippling water.

But the proud builders, the unwearied toilers, where are they? Their task is done. They are gone.

For mark you, children, the Coral Polyp cannot live at the surface of the sea. His home is down below, not, however, in the bottomless pit of the ocean, the very lowest depths.

He starts his wonderful structure on deep ledges that arise from the ocean's bed; but when the

many peaked castle or reef reaches the surface
the patient workmen are all dead.

Questions suggested by the text :—1. What common mistake is often made about the coral animal? 2. What peculiar fact is known about its home in the sea? 3. What is an atoll; a lagoon? 4. What can you find out about "coral groves?" 5. Where does the red coral of commerce come from? how is it obtained from the sea?

TALK III.

THE FIRE GNOME.

D^O you know where the Fire Gnome dwells? Deep down, down, in the very heart of Mother Earth, he rules his burning kingdom.

Of what goes on at his innermost courts we know little. We may easily guess at the lively times down there, however, when we feel the very ground to tremble beneath our feet, even breaking open; and whole clouds of scalding tears come steaming up, with lumps of melted rock, ashes, and mud to boot.

Without a doubt, Fire Gnome would blow us all into atoms, if he had entirely his own way in the matter.

Fortunately he has not, however. Mother Earth, when she found out how obstreperous he was, long long years ago built a big prison wall all around him.

Now this wall is said to be twenty-five thousand miles about and more than thirty miles thick.

That quite takes away your breath, does it not? A wall thirty to forty miles thick! Why that

is many times thicker than the tallest mountain is high.

Nevertheless it appears to be so, and I assure you the mighty Fire King does not consider his prison walls much more than a tough egg-shell; for he is continually breaking through here and there, sending us messages of defiance by his doughty warriors, the Fire Mountains, the Earthquakes, and the Geysers.

When you consider his kingdom stretches over eight thousand miles from end to end, you will perceive that his prison wall, forty miles thick, seems but an egg-shell to him.

Yet for all his mighty strength, his endless train of Fire Spirits, Gas Elves, and Molten Goblins, he is kept pressed down like a very Jack-in-the-box by the heavy-weight servant, Atmosphere, helped by the pressure of the wall itself.

Now to us on the outside of this wall it seems anything but a shell. You believe I am joking when I call the solid ground a shell.

See that little fly on the large school-room globe! Do you think he will go through that hollow ball? You laugh! You have a sort of idea how solid, how immense, that globe appears to him.

We are as so many flies on God's footstool, our globe. Just like his flyship we are twirling around on a great big globe and we never fall off any more than he. Why? Did you ever think of that?

Well it's rather a funny thing anyhow.

You see old Fire Gnome is working his magic on you and me, in fact on everything above him. His heart is really an immense beating magnet, drawing all towards it.

At the same time numberless Airy Sprites, that live in the atmosphere and far beyond, are ready to pull us off with them on their flighty journey to the land-knows-where.

Well, between the two, we stay just where we are, on old Mother Earth's bosom, the best place for her children.

Questions suggested by the text :—1. What proofs have we of the internal heat of the earth? 2. How thick through is the earth from end to end: What is this called? 3. What fraction of this thickness is the crust? 4. Supposing the atmosphere were removed, what effect would that have upon the earth? 5. What is that force called that tends to pull all objects toward the centre of the earth? 6. What is really meant by weight?

TALK IV.

PRINCE VOLCAN.

PERHAPS the mightiest of all Fire Gnome's family is Prince Volcan. Like his father he has a fiery temper, in fact that is a common trait in old Fire Gnome's family. Prince Volcan, however, kicks up the biggest rows of anyone. Every once in a while the king is compelled to exile him, and where do you suppose he sends him? Why, up to us, of course, and I declare those who happen to be in his vicinity when he comes to light, or even after he has departed, tell most wonderful tales of his capers.

He breaks right through the crust at some weak place; perhaps he has been penned up in that spot for awhile, and has worked himself into such a white hot rage, that the space is so full of his raging vapors and sulphurous breaths it cannot contain them longer. Then bang!—a great explosion takes place, and Volcan spits out his wild rage in a perfect torrent of steaming tears, sulphur breaths, molten rock or lava, and burning ashes.

Such an amount of destruction as he does contrive to work is most appalling.

He has been known to pile himself into a height of nearly two thousand feet in a single night.

You understand he is not a mountain to begin with, only a hole in the earth's crust; but he keeps on working until he has piled up a big heap of this half-melted rock all around him; and before long, he turns himself into quite a respectable big volcano with a hollow break at the top; then at last when he is dead tired, he draws a crusty veil over the crater—that's the hollow top—and goes to sleep.

Sometimes he does not waken for hundreds of years, so that the people in his neighborhood have completely forgotten what sort of a creature he is; when lo! all of a sudden, he bursts forth one day just as bad as ever.

This is precisely the way Volcan Vesuvius did in Italy about eighteen hundred years ago. He had hidden himself quite well beneath a beautiful green meadow; and no one thought of connecting the pretty green hill, with the fire mountains, that existed then some miles away towards the west.

In this charming valley lay two fine cities, Herculaneum and Pompeii. They were the popular summer resorts, the Newport and the Long Branch, of the wealthy Romans. Well, one fine day—it was a great holiday, which most of the people had celebrated by going to the circus—this beautiful green hill suddenly turned itself into a

great roaring fire-mountain, pouring out long rivers of steam and ashes which wreathed themselves into a great cloud-umbrella overhead, shutting off the light of day, and falling soon after in a black shower of scalding rain and hissing mud.

Nor did the fierce Fire Prince cease his wicked work until he had completely buried the gay cities, with many of the unfortunate people who had not succeeded in escaping to the sea, so deep down beneath that dreadful ash-heap that they were not heard of again for many centuries afterward.

About a hundred years ago an Italian, who was digging a deep well, struck something strange—a statue of olden times.

The digging was continued and quite a portion of the ancient city of Pompeii was unearthed. I wish I had time to tell you more about it, but we have made this talk quite long enough; so I will draw my remarks to a close, as the preachers say, by recommending every interested boy or girl to read that most wonderful book, “The Last Days of Pompeii.”

It tells the whole story of a fire-mountain’s destructive work; and best of all it tells us a great deal about the people of that city; and how they acted in that awful excitement. You may well believe there is not a dull page in the entire book.

Questions suggested by the text:—1. What other names might you give a volcano? 2. What is the general shape of a volcano and why? 3. What is meant by the crater? 4. Name

some useful products of a volcano. 5. Find out the name of some famous volcano and tell something of its destructive work ?
6. Volcanoes do a great deal of harm ; do they do any good ?

TALK V.

OLD DUNDER HEAD.

THIS old fellow is quite as important a member of Fire Gnome's family as Prince Volcan himself.

Old Dunder Head, as his name indicates, is an inveterate grumbler. He does not fume like Sputter Top, or rage and roar as Volcan does, but in his own rumbling way his temper is quite as bad.

Why he makes the very earth to tremble with his growling! He lets us know something of what those fire-sprites are up to down there. When a number of them get together in one corner lot, snarling and fighting, they turn it into a regular gas and steam factory.

Then old Dunder Head gets angry and wants them to clear out. So he grumbles and growls at them, until they are compelled to shift their quarters. Sometimes there is no room for them all to the right or the left and crack! they go, clear up, through the earth's crust.

Of course it makes no difference if there is a fine

city right above. These fire-fiends will swallow it directly—people, palaces, shanties and all,—in less time than it takes to tell it.

I must say to the credit of old Dunder Head, though he is a great hand at growling and grumbling; he does not work so much mischief as some of the others do.

In some places, in the Andes countries, for instance, where Prince Volcan is always raging more or less, the people are so used to Dunder Head's little tempers that they scarcely mind him at all. They build their cities right over his very nose; and when he gives them a shake they simply say "it is earthquake weather." As I have told you they sometimes pay dear for their boldness.

It must be an awful thing to feel the solid ground sway and rock beneath one's feet. Then to think of an entire city with its strongest buildings tottering; its doomed inhabitants crushed, suffocated; all destroyed in less than three minutes perhaps.

What an awful thing this must be! We cannot really picture the anguish, the terror of such a calamity. We are ready to say why should these things be?

Let us think a little. These dread fire-servants, fiends, I think I have called them—so they seem to be when we consider only the terrible destruction they have wrought—are really working for you and for me, for us all on the big globe.

Undoubtedly you have seen for yourself how

that great master, the sea, is continually washing away all he can take from our home the land. Much of this he lays down on his deep, deep floor, the ocean bottom. Suppose unchecked he continued his bold work. In the process of time, you can imagine we should have no foot-hold on land whatever.

Now at the same time old Fire Gnome and his servants are raising such commotions, they are also working against Sea King.

He tears down, or rather away, and they slowly, but surely build up.

How ! by raising the crust, here and there, out of Sea King's reach, to be sure.

The bottom of the sea, like the surface of the land, is made up of wrinkles with hollows between, mountains and valleys.

The strong old fire-giants take these hills on their mighty shoulders, and just raise them up, up, until they tower far above the angry sea.

Some such work as this they have been doing for ages; so do you not think they are, on the whole, our friends and not our foes ?

Questions suggested by the text ;—1. How is the heated mass beneath the earth's crust like the sea ? 2. We recognize an earthquake by a rumbling sound, but an earthquake is not a sound ; what is it ? 3. Can you give a sensible reason for it ? 4. Did you ever hear of "the great earthquake" of Lisbon ? 5. What can you tell of the earthquake, not long since, at Charleston ? 6. How do earthquakes help to change the face of the earth ?

TALK VI.

SPUTTER TOP.

SPUTTER TOP! Pray who is he? Do you not know him? Just think a minute. He is another of Fire Gnome's numerous family, a lively one too, like all the rest.

I really think however he is much better behaved; at least he does not work so much mischief, for which I am devoutly thankful, as he is a constant visitor, I could almost say, resident of our own country.

I much prefer him to old Dunder Head or fiery Prince Volcan.

Sputter Top is always attended by a train of smaller Sputter Tops. He generally selects bare lonesome places; so for that reason he likes to surround himself with his own immediate family I suppose.

As this immediate family is known to count up to nearly three thousand of all ages and sizes—hoary old Sputter Tops, dignified, middle-aged Sputter Tops, frisky young Sputter Tops down to toddling Sputter Tops—all bustling about so that

they require twice as much room as quiet folks. Do you wonder then that they need more than a corner lot to spread themselves out? In short nothing less than an entire park will do such a large family as I have referred to.

They are quite a good-looking set too. They make the prettiest fountains you ever saw; painting their rims or basins often in dainty pink, vivid green, or bright yellow.

Like any well-ordered orchestra, they play in concert or in part, leaving the prominent solos to the more important members.

Their tuning-up is rather queer, not so much on the sawing or squeaking style, as the bumperty-bump. Deep chest notes they are, coming up their voice-pipes or throats, from the very depths of the earth.

After such a prelude appears a great spray of singing steam, and sputtering, spluttering jets of boiling water; emptying the gayly colored basins around, while shooting the dying steam-column several hundred feet into the air.

These open air concerts last anywhere from five to twenty minutes and follow each other at intervals. The regular performers are often called "Geysers" by the people living near by, who, undoubtedly, find it very handy to have hot water when needed, without bothering to boil up the tea-kettle.

The most noted colony of Sputter Tops is, as you are probably aware, in the western part of our

own country, in a spot called Yellowstone Park. But the biggest Sputter Top or Geyser is found far from the crowded haunts of men, up in the cold northern seas, in a lonely island very properly called Iceland. Here is the home of the "Great Geyser" as he is called, and his train.

Questions suggested by the text :—1. Where are hot springs most common ? 2. What name is given to those that spout at intervals somewhat regularly ? 3. In how many ways might we compare a geyser with a fountain ? 4. How are rims formed about the mouths of geysers ? 5. What can you find out about "Old Faithful ? "

TALK VII.

LITTLE AND BIG.

I THINK we have rather slighted old Mother Earth herself lately, so let us try to make it up before she feels herself neglected. Isn't it just wonderful how she goes on a-spinning in the heavens, never missing her balance, or wearying of her endless journeyings?

What a grand old humming-top she is! You needn't laugh, I mean it. Did you ever hear a mosquito hum? I doubt it. That noise you have noticed is only the rubbing of his wings together. His tenor notes are too fine and high for our dull ears to hear. So with Mother Earth, her music is beyond the range of mortal ear. I wonder if the angels like it!

Whether we hear it or not, she spins round and round on her pegless end, started in the beginning by God's all-powerful finger, and kept in her own narrow path by the same unfailing power.

How vast! how immensely large our Earth seems to us. If we were to start on a journey all around her by express, stopping neither day nor

night, it would take us more than a month to do our traveling. And yet our big world is but a speck in the world-sprinkled heavens. Why the sun is a million times as large!

You boys and girls have a habit of using the latter expression so perhaps you understand it; but I must confess that I have no correct idea of a million; so I like better to say that if you were to place the center of the sun over the centre of the earth, the sun would reach many thousand miles beyond the moon, and the moon is thousands of miles from the earth.

Well you see a thing is large or small according to your view—but let us turn back to this spinning.

Why should old Mother Earth, if she is such an insignificant little thing, work on—on in her endless spin? There are mighty reasons. A speck of dust, the tiniest drop of oil will sometimes interfere with the working of a watch. Now God's wonderful handiwork, the starry heavens, is far more exquisitely adjusted, part to part, than the most delicate machinery of the finest watch.

In fact the works of a watch are but the weakest imitation of the mighty machinery in the heavens. An atom of a moon, a speck of a world, a large glowing sun, each has its appointed work and it never, never fails, for God's hand is over all.

Questions suggested by the text :—1. What is meant by the earth's axis? 2. How many miles about is the earth? 3. What

is meant by the term "circumference?" 4. What keeps the heavenly bodies in their places? 5. What is a planet? 6. What planet is nearest to the earth?

TALK VIII.

AN ENDLESS SPIN.

YOU have noticed perhaps that your humming-top, shortly before it stops, begins to stagger or rather to strike out into an irregular curve, as though it had become top-heavy.

Now that massive top, our Earth, does not do this at all but what do you suppose she does instead? Why, she just tilted herself a little in the beginning, and round and round she goes to-day, at the same tilt; never changing or toppling over further.

You have heard before how, as she turns one side of her round, wrinkled face toward King Sol, he sheds upon her his glowing light which we call "day," and as Mother Earth is not made of glass, not transparent, the light cannot get through to the other side, so there it is darkness or "night." Thus she, like the excellent time-piece she is, spins out for us all a light time for work and a dark time for rest.

While she is whirling about on her giddy self so rapidly—just think of it, more than a thousand

miles an hour—she is also taking quite a step forward in her appointed curved path about the sun.

She has heavenly neighbors, who just like herself are twirling gayly round on themselves, as they perform a slower round dance in a big oval path about King Sol. Sometimes they cross over each other's paths but never so closely as to interfere. Now this big oval path which the earth treads so steadily is called her orbit; and the whole space between her and the sun, the whole dancing floor in fact, that is called the plane of her orbit.

Now the earth keeps herself tilted toward the dancing floor all the time as she rolls about the sun; so if you think a little, you will see that King Sol sheds his best rays of light and heat, on the part that is best turned toward his cheery old face.

As the busy earth whirls on to another position on the big dancing floor, having kept her impartial head turned at the same tilt, another part of the surface gets a chance to warm itself specially in the hot rays of the sun.

Folks call this special warming time “Summer” and speak of the different changes as the “seasons.”

Questions suggested by the text:—1. Do you know what the earth's orbit is? 2. What is meant by the plane of the earth's orbit? 3. How is the earth's axis tilted or inclined? 4. What is the result of this tilting or inclination? 5. What would happen to the earth if the sun's rays were withdrawn, even for a short time? 6. We are nearest to the sun in winter, why is it colder then than in summer when we are furthest away?

TALK IX.

A THICK VEIL.

A THICK veil? Well, rather; forty miles at least. Ha-ha! it's something about Dame Earth, we feel certain, but does she really wear a veil? We imagine from your previous remarks that her rough, wrinkled face requires no such protection.

All very true, my clever young miss, the old lady cares little for her looks; nevertheless she wears that veil, for whose benefit think you?

Round and round she rolls in heavenly space, wrapped "like a bride in her silvery veil." Now this heavenly space is black, utter darkness and bitter, bitter cold. Our light and heat come to us from the sun; but there must be something to hold these forces, to trap them as in a net; otherwise they are a dead loss to us.

This beautiful fairylike work is done by that translucent, fleecy scarf, the atmosphere.

King Sol, resting neither night nor day, from his glowing fiery throne, dispatches his endless train of dancing, quivering sun-beams.

Off they go making a bee-line for the uttermost ends of the universe. Now as they approach us, deft-fingered Mother Earth just catches a sufficient number of the tricksy elves in her fleecy veil; and the contented little prisoners spread themselves out as comfortably as possible, lighting the sky with that beautiful blue, and warming almost every corner more or less.

So you see it is this wonderful veil, our atmosphere, that catches the light-beams and the heat-beams; spreading them and bending them so that they may reach the earth for our light and comfort.

These dancing sun-beams would do us little good, you see, if they were not trapped so cleverly. It is they that make the beautiful blue sky for us. Heavenly space is utter darkness as I have said; but these God-given light-beams piercing the shimmering veil, touch with their fairy fingers your eyes and mine, so that the black darkness is turned into a heavenly blue.

All color upon our variously painted earth is due to the same cause. Waves of dancing light fall upon the grass for instance; they break and some are lost; the remainder the eye absorbs and we call it "green." In another case a group of light-waves, different to the eye, is left upon an object and that we name "red."

Questions suggested by the text :—1. If there were no atmosphere, how would the sun's rays affect the earth by day? 2. What would happen directly after sunset? 3. How is twilight caused? 4. Is the sky really blue? 5. We should have summer every day and winter each night if it were not for what?

TALK X.

MADAME HEAVY WEIGHT.

YOU are just ready to inquire, I surmise, why I have called so light a creature as Air, the heavy-weight servant. Well, I think she has some legal claim to the name, when she proves herself able to press upon a single square inch of surface with a fifteen-pound weight.

If that be so, how is it that each one of us, subject to a pressure of several thousand pounds, is not crushed to atoms? Simply because she presses equally in all directions; so we do not feel her heavy foot upon our necks, in fact we look upon her as the lightest fairy of them all.

Another name for Madame Heavy Weight is atmosphere, that is vapor-sphere, at the bottom of which we live just as so many fish deep down in the sea. Now this air-sea is forty miles deep and is made up chiefly of two gases, oxygen and nitrogen, together with more or less of vapor and carbonic acid gas.

Let us see what these good little elves and fays do for us. In the first place, the lively elf Oxygen

insinuates himself into every corner of Nature's kingdom whether animal, vegetable or mineral; at any moment ready to strike up a burning friendship with animal, plant, or stone.

Often when he has full sway he literally burns up, as we say, his victims; so for that reason Dame Atmosphere usually sends cool-headed Nitrogen with him on his airy journeys. Now Elf Nitrogen, dark and gloomy as he is by himself, makes an excellent companion for the over-lively Oxygen, toning down the fires which the latter is everywhere ready to excite.

When, for instance, the ever-ready, hot-headed sprite pays our lungs a visit, his quiet brother is close at his heels, mingling with his very breath; so that we receive not our Oxygen undiluted. He would burn us up in short meter alone. We could not long stand such a fiery intruder; but in connection with his quiet brother, he is our most welcome visitor, supplying us with just kindlings enough for the fire of our lives.

Our life is in reality nothing but a burning.

Questions suggested by the text :—1. Can you think of another name for the atmosphere? 2. Is the pressure of the atmosphere always the same? 3. Do you know why it is more difficult to breathe on the top of a high mountain than at its base? 4. Of what is water made up? 5. How is oxygen necessary to our lives?

TALK XI.

A GOOD RIDDANCE.

WHEN Master Oxygen is about to take leave of the Animal kingdom, where he is so constant a visitor, he strikes up a strong friendship with a black slave named Carbon. You recollect how ready he is to make friends, be they black or white, it matters not.

At first this friendship proves a happy as well as most useful one ; for they do make the best of bonfires, these two together. Of course the poor black slave is, in the beginning, highly flattered by the companionship of his lordly friend ; but after a while he grows tired of the continual service demanded of him, though he dare not complain openly.

So he lays his plans most cunningly. With the utmost meekness he proposes a flying visit to the neighboring plant kingdom which, he secretly knows, has little love for the lordly elf, much preferring his own black visage.

In the middle of a bright sunny day, the strange

- pair arrive at Green Land, where swarthy Carbon is received with shouts of welcome as the general benefactor, the chief food provider of the realm.

Now Lord Oxygen, all unnoticed, wonders greatly at his lack of greeting ; for he is usually accustomed to the utmost attention. After silently viewing the strange scene for a time, he turns on his winged heel and flies straight off to the willing ear of his patient mother, Dame Atmosphere, with a long tale of his grievances.

Now the shrew'd old dame, who is at heart much pleased at the safe return of her venturesome son, soothes his smarting wounds by telling him he is well rid of such low comrades ; and bids him look at the heap of invitations from his animal friends, who, so to speak, are actually pining for his life-giving fellowship. Which words have scarcely fallen from her speaking lips, when the worthy dame perceives her young Apollo, all appeased touch his winged spurs and—presto ! he is off once more in his never ceasing quest of new worlds to conquer.

Questions suggested by the text :—1. How does air become impure ? 2. What becomes of the oxygen that enters our lungs ? 3. What is meant by a poison ? 4. How is poisoned air made pure and wholesome for us ? 5. What element of the atmosphere is a source of nourishment to all plants ? 6. The same is what to all animals ?

TALK XII.

MASTER VAPOR'S BLANKET.

MASTER VAPOR is another kind elf. He acts as a sort of blanket at night, and a right comfortable one he is too. How we should miss him were he to take himself off to regions unknown!

You see Mother Earth is something of a spend-thrift ; she gives as freely as she takes. All day long, golden sunbeams, she receives with open hands ; but not being a miser she does not hide them deep away ; so there they lie loose and free upon her generous bosom. Now you know that riches soon take wing ; so at the close of day these golden sun-flakes, scattered so yellow and warm over the earth's surface, raise themselves upon their swift gauzy wings, and up they wantonly soar, leaving all places behind them cold, dark and desolate.

Alas for poor Mother Earth ! Is she left friendless ? No ! no ! Master Vapor is at hand ; seizing, right and left, each reckless fay of them that he

can lay hands on ; and then he holds them in his soft elastic blanket, compelling them to give back to Dame Earth a portion, at least, of the warmth and light they so boldly attempted to carry off.

How do you suppose the saucy little fays resent their bold capture ? You know what pretty, golden, yellow beams they are by day. Well, when they are caught in Master Vapor's blanket they turn quite pale with anger or fright, and finally faint away entirely. They cut up these capers at the time we call twilight or doubtful light.

However, whether they mean it kindly or not, we all love this twilight, this gradual fading of daylight. Were it not for our atmosphere, this vapor-sphere about us, we should be plunged directly from the bold glaring light of day, into the black darkness of midnight. How dreadful that would seem to us ! No gray dawn ! no soft twilight ! and saddest of all, no blue sky !

It is the atmosphere that catches the first gray dawn-beams, before the sun has fully raised his shining face upon us ; and it is the atmosphere that holds the last straggling rays long after sunset.

Again during the day, Dame Atmosphere, like a translucent veil, shields us from the too fierce rays of the sun, and it is only by looking through this pretty veil do we see the space above—the sky we call it—blue.

Is not Dame Atmosphere a veritable fairy god-mother to work such magic for us?

Questions suggested by the text :—1. How do rivers measure the amount of vapor of the atmosphere? 2. Why is it that we notice vapor issuing from our mouths in winter and not in summer? 3. In summer, you have often noticed drops of water on the outside of a glass of ice-water. Did those drops actually pass through the glass? 4. Where are the famous fog banks?

QF

TALK XIII.

THE WIND CAUSEWAY.

THERE is the utmost friendliness between plain Mother Earth and her more elevated neighbor, Dame Atmosphere. So much so, that the aristocratic daughters of the air do most graciously bend their cool stately heads earthward, to whisper pleasing words to their humble sisters down below.

Now Mother Earth is a generous old soul, as I have before stated. She receives her cold, stately visitors most kindly; opening freely her stores of preserved sunlight, which are continually being sent right through Dame Atmosphere's region without stop, dealing out to her willing guests with lavish hand.

They come cold, heavy, and empty; they leave warm, light-hearted, and well laden. Naturally there is a constant stream of visitors to and fro. So much so that a regular highway, from earth skyward, had to be built, called the "Wind Causeway."

Now this causeway is the scene of many a lively

action ; for it often happens, a rush of heavy-footed, downward travelers meets a warm current of light-hearted creatures bound upward; and they do get into a sad tangle, right then and there.

In that case the guard, Fleet Foot, stationed there by Storm King interferes, and orders the passage-way cleared in no gentle voice. If that does not answer, he just roars and blusters about in such a threatening manner that the affrighted travelers rush away helter-skelter, pell-mell, to get out of the way of his fearful tongue and swift wings. It is said he can fly at the rate of a mile a minute.

Of course "such a breeze" is not always raised. Some of Dame Atmosphere's children are much better behaved than others. They come and go so quietly we are scarcely aware of their presence, until they are close beside us, their invisible wings fanning our fevered cheeks, and their soft voices murmuring sweet music into our listening ears.

Questions suggested by the text :—1. Can you think of any way in which the air-ocean resembles the ocean of water? 2. Heat and vapor are unevenly distributed in the atmosphere; what results from this fact? 3. Why do sparks fly upward? 4. How are currents of air formed? 5. Of what use are winds? 6. What are the "Signal Service Stations?"

TALK XIV.

A CLEAN SWEEP.

THERE are no busier creatures in the world below, or in the heavens above, than these willowy, billowy, lightsome daughters of the air.

Morning, noon, and night, they wing their glad-some way to the uttermost ends of their gracious mother's kingdom, bending low over the toiling, sweltering earth ; here cooling her fevered brow with their fragrant dewy breaths ; there laying down upon the parched regions misty wreaths, which they have gathered in their swift flight over the sea ; still again bearing waves of warmth to the frozen ends of the earth.

You imagine these winged messengers to live a life of endless confusion, do you not ?

There you make a grievous mistake. Dame Atmosphere is the wisest of mothers, holding excellent control over her numberless children. What might seem to you or to me untold confusion is only her clever far-seeing way of putting things to rights.

You recall the panic on the Wind Causeway? The shrewd dame foresaw all that, in fact she planned it herself. That highway had become choked and unclean with the dust of continual travel, and she determined to have it cleaned. So she privately dispatched Fleet Foot, her son Storm King's special messenger, to stir up one of those rows for which he is so famous.

In just such a scrimmage, Dame Atmosphere succeeds in accomplishing her airy street-sweeping; for by the time the hurry-scurry is over, the choking clouds of dust kicked up, have been carried off on the countless wings of the fleeing travelers.

Occasionally Dame Atmosphere uses two other servants to assist Fleet Foot. They are Thunder Bolt and Lightning Flash. Thunder Bolt makes a great noise, while Lightning Flash does the scouring work in a jiffy.

You have noticed perhaps how closely they work together. Lightning Flash darting hither and thither at break-neck speed, and Thunder Bolt rumbling on close in her wake, to let us know how near by they may be; for Lightning Flash is a reckless kind of creature. Her scouring fluid, electricity, is a powerful stuff; and though she may use it freely to clean house with up yonder, down here we find it extremely dangerous, if not fatal to our very lives, to have it loose about.

Thunder Bolt, though he frightens us sorely by

his fierce roar, is really our friend ; for he lets us know how near by Lightning Flash is scattering her powerful, scouring fluid.

Questions suggested by the text :—1. What is the only difference between a storm and a “gentle zephyr ? ” 2. A storm is caused when and how ? 3. What good is derived from a storm ? 4. Did you ever hear of cannon being fired off into the air to produce a storm ? 5. What makes lightning ; why does it strike trees or church steeples oftener than other objects ?

TALK XV.

HEAVENLY TEMPERS.

WELL, there appears to be considerable difference as to temper in Dame Atmosphere's countless brood; yet when you come to be well acquainted with the entire family, you really find only about three varieties, just enough to make things lively.

In the first place there are the Steady Blows. No matter what turns up, you find them in their own appointed place attending strictly to business.

Their wise mother, knowing full well their trustworthiness, has given them most important work to do. They never fail her.

You see some of the younger air-fays get to frolicking with their merry play-fellows the sunbeams, who gather in the greatest numbers at a certain spot about in the middle of the air-kingdom. These rogues of air-fays are bent on having a good time; so they just romp and race with their gay comrades, until they become intensely over-heated. Why the very air about soon feels like a furnace blast! Little care the over-heated giddy

creatures for this ; for most of them take to their flighty wings and hasten off to some cooler region.

They do this thing right over again and again. For this reason the Steady Blows are stationed close by, to fill the vacated places with their cool patient wings.

So faithful and constant are they in this never-ceasing work ; that even the children of men, down here below, count on their aid to assist them in urging their vessels over the tropical seas where these "Trade Winds," as the sailors call them, continually do blow.

Questions suggested by the text :—1. What becomes of the light heated air of the tropics ? 2. Where does the heavy cold air of the polar regions go to ? 3. Supposing the general circulation of air ceased ; can you imagine how this would effect the hot regions ; the cold regions ? 4. Why are constant winds called trade winds ?

TALK XVI.

BLOW HIGH AND BLOW LOW.

IT is rather an odd little story about these two breezy little fellows. They live, not exactly in a cottage by the sea, but rather in the air-castles over-head. The funniest thing about them is the way they change places.

One lives over the sea, the other over the land. There is nothing very funny in that you are ready to exclaim—just hold on till I get through.

They change houses every day ; and for all they are so very near to each other, they never meet. Let me tell you how this happens.

Blow High, from his tall towers over the warm land, just basks in the golden sunlight, too pleased or too lazy to leave the day through.

Blow Low on the contrary, in his cool lodge over the sea, is awakened early by the singing waves and gayly follows them on their merry, dance all the long day, landward. By night-time he has worked himself into a sort of fever ; and like all air-children when heated, he must up and away to cooler places.

Ere he is aware he finds himself in Blow High's empty, now cooled castle above the sunless land.

For at the close of day, Blow High had found his pleasant, warm quarters growing gradually colder and himself sinking down surely like all air-children when cold. But he could not help himself; so on, on, he floated right out to the empty sea-castle awaiting him.

Then the cottagers by the sea say: "It is so pleasant here. We have a sea-breeze by day and a land-breeze by night."

Questions suggested by the text:—1. Which absorbs the sun's rays more readily, the land or the sea? 2. Which retains the heat longer, land or water? 3. How is it, at the sea-shore, you sometimes find the water quite warm on a cool day? 4. What makes the sea-breeze? 5. How is the cool land-breeze at night caused?

TALK XVII.

DAUGHTERS OF THE AIR.

PERHAPS of all the children of the air, these water-bearers are the most beautiful. How we love to watch their fairy-like forms floating gracefully above our heads.

I think we love best to watch them, when the sunset's glorious rays light up their snowy banks with ever-varying rainbow tints. We feel certain that here is fairy-land.

Do we not see for ourselves the very marble palaces with their golden thrones; numberless glistening mansions with fairy-like heads peeping out from behind the silk'en purple curtains?

Yes, at times, we catch a glimpse of the Queen of Fays herself, holding high revel in the midst of her happy subjects. We even behold, off in the deep purple, shadowy giants holding back the gates of day that we may gaze upon these glorious air-castles. Yes, oh yes, we love the fleecy clouds so ready to give to our mortal eyes a sight of longed-for fairy-land.

Dame Atmosphere tenderly loves these beautiful daughters of hers and guards them most jeal-

ously. Do you know why? Let me whisper the secret low in your ears.

They are, in truth, the children of the sea. As they frolicked upon its blue, heaving bosom; so beauteous were they that Dame Atmosphere cast an envious eye upon them. Nor did she rest until she had obtained from mighty King Sol himself, his most powerful aid, to secure for her these pretty babes so gayly sporting down below.

And soon the soft enticing sun-rays smile upon the lightsome creatures, breathing warm magic breath upon their tender foreheads, and weaving for their dainty limbs a gossamer cradle; which full swift is seized, and lo! upon the golden sunlit wings is borne the precious stolen burden. Up, up, to the feet of the anxiously waiting Queen of Air.

The gay, sportive children of the sea become light, graceful daughters of the air. And the Air Queen buries deep the guilty secret in her heart, while she guards these stolen offspring with her utmost care. Full well she knows the time of reckoning will surely come. King Sol, though he might listen for the time being, to her tearful pleadings, deals out justice with an even hand.

In the mean time the cherished creatures, forgetful of another home, blossom each day into new beauty as they gladly flit hither and thither at their gracious mother's bidding. And lo! one day they stand ready for a distant journey, en-

wrapped in fleecy scarf, with winged sandal on the feet.

The mother-queen, with foreboding fear, repeats her never-failing words of warning, which so often heard are scarcely heeded.

Away they float with graceful outstretched arm, soon lost to the eager mother's seeking eye in the fathomless blue of heaven.

'Tis the close of day and the weary sisters seek to fold their tired wings and be at rest. Alas! no haven is at hand. They are lost in the trackless waste of ether which even now grows cold and gloomy. "Whither go we?" whisper faintly the heavy-hearted band, as they slowly sink down, down, in the cold depths of the fast darkening sky. "Ye go back whither ye came, oh children of the sea! Your airy pilgrimage is at an end, the thirsty land hath need of your welcome tears."

At these chilling words, the gauzy band burst its frightened heart, and fell in pearly drops upon the parched earth beneath.

Questions suggested by the text :—1. Of what use are clouds? 2. How does the sun draw water from the sea? 3. What becomes of the vapor thus formed? 4. What causes a cloud to burst? 5. In what zone does the most rain fall?

TALK XVIII.

WATER KELPIES.

WHEN the stricken, hapless daughters of the air vanished so swiftly into space, there suddenly sprang up in the same spot, a countless throng of pattering, jostling Water Kelpies.

Such a noisy, bustling, jolting band, caring naught for one another, eager only to get down, down. Through miles of airy sea now cold, now warm, ever varying, they hurry laughingly and fearlessly greet Storm King as he frowns at them from his watch-tower on the Wind's causeway, yet stopping for nothing.

Down, down, they hasten obedient to the secret magnet buried deep within old Mother Earth's bosom. Yes these Water Kelpies, cloud-children though they be, are surely bound earthward. They are too gross, too heavy to dwell in light, warm, ethereal realm, so downward they hasten.

Why, they know not. Whither, they know not. Only to live, to fly is joy. Happy, reckless, little Kelpies!

Now they burst upon the earth in overwhelming numbers, kissing tiny flowret, showering lordly

oak, whispering gayly to listening children beneath the pattering roof, dancing merrily over river and lake.

Where, where, is their journey's end? Do you not know? Where else but the sea. Did not the Air Queen, aided so skillfully by powerful King Sol, rob the Sea of her sporting children? Ah! how beautiful to the eye were they; as so gracefully they floated upon their snowy wings in ethereal realms.

Sad was the day when the icy finger of strange chill wind touched their fleecy robes. Then burst their frightened hearts and they were no more. Yet strange to tell, from these very tear-drops, sprang the wanton Water Kelpies who stopped not in their downward, onward flight over green land and singing river; till on the broad bosom of the restless sea they bathed their weary wings and sank to rest.

Questions suggested by the text:—1. What is the common name for frozen vapor? 2. What makes rain drops fall to the earth? 3. Where does the most rain fall, on land or on sea? 4. How is a mountain a great rain-catcher? 5. What becomes of all the rain that falls on the land?

TALK XIX.

FAIRY NIGHT-CAPS.

DID you ever watch a mountain put on his night-cap? It must be a fairy night-cap, for it is woven anew each night, vanishing in the usual magic fairy-like fashion at morn.

High Tone, a mountain peak near by, always wears just such a night-cap I notice. He is very exclusive, living high up yonder, all by himself, at quite a distance from us simple folk in the valley.

He does not seem to mind our staring, however; so I often watch that night-cap appear in the evening, and again vanish early the next morning.

The fairy weavers are invisible to mortal eye. They are there I know by the evidence of their work, and I believe they do their weaving something like this.

High Tone is a cold creature, especially after sundown. Not only is he cold himself, but he chills the air about him. This air contains Master Vapor with his warm, moist blanket; and he is so kind as to let the ever-present little air-fays take a piece of it to make a night cap for High Tone's bare head.

The minute they drag it in to his cold head it becomes visible. In the morning, when the sun's warm rays would make the cloud-cap uncomfortable in the warmth, fairy magic causes it to rise and gently fade away in the blue sky as a grey mist.

Over the trees, the same tiny hands weave a pretty silver-grey scarf which perhaps you have noticed. It is knitted in the same way exactly and is whisked away by the morning breeze.

Simple folk have a way of calling these fairy magic-mists and scarfs, "mist" or "fog."

Our names for them are much more appropriate, do you not think so? Witness what are these delicate veavings but thin of the air-fays.

Questions suggested by the text:- 1. What causes mist at nightfall? 2. Why does it so often disappear with the advance of day? 3. How is fog different from an ordinary cloud? 4. What is we call frozen dew?

TALK XX.

SCATTERED PEARLS.

YOU must not think, for a moment, that the Air Queen would allow her children to be so partial, as to weave special gifts for mountain or river, shutting off the rest of earth from their kindness.

You know how the whole green earth gives out carelessly, at night-fall, the precious heat so freely bestowed by the sun the long day through. The same little Air Fays gather it all with their busy hands so that nothing may be lost. Then they bend low over each cold leaflet or stone, breathing their warm breath upon its chill surface and behold! the whole land is scattered over with shimmering, glittering pearl-drops.

Where beside, do we find so generous a gift of precious jewels? The tiniest leaf, the loftiest forest-oak sparkles on every side in the silver starlight.

Sometimes, on a clear, cold night, it happens that these generous fays, striving to out-do themselves, add a frosty lace to their lavish gifts. What more beautiful sight is there, on a bright,

very morning seem to be the most solid and interesting topics indeed but will such ever last and produce peace?

What could we expect such poor people? It is the work of their masters who, when the Great Father has planned all possible wisdom is to make our people in life not fully comfortable nor joyful also. I wonder if our eyes are always opened to the many, many blessings surrounding us.

Answers suggested by the text -- 1. What becomes of the people of the world so readily influenced by the world during the day? 2. Is it wise for the wise from leave the earth? 3. How does the condition of things affect the surrounding air? 4. Does love turn analytical? 5. How are places treated in a similar manner?

TALK XXI.

ANGEL FEATHERS.

SOMETIMES it happens that the Water Kelpies meet with a sudden dash of cold air, when they reach about half way in their downward flight. Now this icy touch turns them into the prettiest crystal stars imaginable.

They lose at this time all that harum-scarum bluster and noise; dropping down gently like so many snowy feathers from the wings of the angels. You know, however, they do not remain long with us in the great cities. The commotion and close-ness are too much for their delicate natures and they softly die away.

Far up in the mountain regions, where it is so cool and quiet, these Angel Feathers find it more agreeable; so there they remain quite content, far from their ethereal home, with myriads of their fleecy sisters continually falling to keep them company.

But you say, if that be so, do not these Feather Flakes fill up the entire region to the utter exclusion of all else? Well no, not exactly. It is something like this. As they crowd the mountain-top and along his sides, those down below are pressed so hard by the ever growing mass of Flakes above

them, that by and by, when the pressure can no longer be endured, down the slope they glide; for they just cannot do otherwise between that everlasting crowding from above and a mysterious something—you know Old Mother Earth's magnet-heart—pulling them downward.

So all unconsciously they glide slowly down the mountain slopes, meeting, at the various turns in the road, their unfortunate sisters who have been treated in like manner; and they fall into each other's arms, so uniting into a fleecy mass, still helplessly slipping downward and finally melting into a river of tears in the valley far below.

That is the cool way the surplus snow sisters are gotten rid of. Those who are left have room enough; for the snow-capped mountain, after each added snowfall, just keeps so many on his spotless crest and lets the rest go in the way I have related. But let us follow the closely pressed Feather Flakes on their downward course. You see, after a while, with all that pressure from their cruel mates above and from the mountain walls on each side, they become hard, cold, and colorless—a mass of ice in fact.

Now this mass of ice, dragging itself slowly down the mountain side from the everlasting snow-fields above, is called by the people of the valley a glacier, that is, a river of ice.

These soft, fleecy snow sisters, as they harden into an ice-river, lose their gentle tempers and

scratch the mountain sides quite severely. Yes, more than that, they just break off pieces of rock and earth, carrying this rubbish with them on their icy bosom. For you see the glacier being more or less solid, this load cannot sink much below the surface, excepting in cracks here and there.

So there remains a sort of earthy ribbon on the sides of the glacier.

When the lower valley is reached, the glacier, completely tired out with its slow, rough journey, melts away in the warm sunshine into a rippling streamlet which hastens on to join others, thus forming the source of some leaping, singing river.

Sometimes it happens that the lowlands lie in a cold region bordering on the sea. In this case the glacier does not melt at all or stop either. It turns itself into an ice-arge and floats off to sea.

Without sails or rigging it sails on, on, a high mass of ice—only think of it—often a couple of hundred feet above the water while perhaps six times as many feet below. The sailors call these strange rudderless boats, ice-bergs, that is ice-mountains.

Questions suggested by the text:—1. What is the common name for frozen rain? 2. Did you ever see a star in a snow-flake; how many points did it have? 3. How is snow a blanket to the ground? 4. How are a river and a glacier alike; how different? 5. What is an avalanche; a boulder? 6. How is it that the snow fields, far up in the mountains, remain about the same year after year? 7. Do you know any large river that springs from a glacier?

TALK XXII.

COLOR BEARERS.

A NOBLE army of artists are these, who have their home in the air-sea on high. It is they who tip the wings of the morn with glorious rosy hue; and flush the sunset gates of day in royal purple fringed with gold.

Their magic fingers oftentimes span the heavens in the yellow summer rain, weaving a bearlike arch of colored light. The black vault of heaven, swept by the brush of these heavenly artists, becomes a welcome well beloved blue.

When for a time the great Sun hides his face from the frozen ends of the earth, these unwearied artists are on hand, lighting up the dull heavens with shooting streamers of glowing light; now a warm red, now a sheeny silver, again a delicate violet.

Not only do the inspired painters color the heavens with matchless hue; but as so many angels, messengers of light, they wing their glad way to our dark earth, painting each flower and tree in unrivaled hue. How much of our life's happiness is due to these Angels of Light, these heavenly Color Bearers.

I have already related something of their way of working; how they seize King Sol's light beams in the Air Queen's fleecy veil and so use them as a basis for all color-work. Mysteriously rolled up in a single white light-beam, are all the colors seen at any time in the entire universe.

Now these cunning artists understand this wonderful fact fully; and not only that, but they know just how to handle these color-freighted beams so that a wave of warm red, of vivid green, or of delicate purple may be produced.

They are so quick about it too. Sometimes they even lay hold of the slippery Water Kelpies on their swift downward way, sending the white sunbeams through their transparent little bodies; and then we see that never-failing delight, the rainbow, painted in seven glorious tints, all drawn out of these simple white sunbeams.

These simple, white sunbeams form the color box of the entire universe.

How do these Color Bearers bring down those gorgeous hues to us on earth? The white sunbeam is not a single beam at all; but is made of millions of dancing waves of light. Now these light-beams strike upon a tiny violet for instance; and they are absorbed or lost upon its delicate face, excepting one group of light-waves. This group our eyes take note of, and we call it "purple."

Our eyes, you must know, have a crystal drop

set in them by which we are able to regard this action of light.

Those colored arches of light, seen at the frozen ends of the earth, are worth speaking of. They vary greatly; but the most common form is a bright arch near the horizon, shooting out toward mid-heaven quivering streamers of silver, green, or ruddy light. At times, however, the entire heavens seem to blush rosy red—just think of it—at midnight.

Questions suggested by the text:—1. How is it that we have light before the sun actually appears in the sky? 2. Have you any idea when the light we are now using started on its journey from the sun? 3. What makes the grass green? 4. Color is essentially what? 5. When in a storm, do we see the rainbow? 6. What is a mirage?

TALK XXIII. TRAPPED SUN-BEAMS.

COULD you believe that such glancing, dancing elves as the sun-beams, flying over thousands of miles in a single second, might be shut up in a dark trap for an ocean of time, and then actually let loose again just as lively as ever?

Yes, this is really true! Who do you suppose were deft enough to set the trap for these sprightly Sun Elves? The quiet gentle plants did this clever work.

You recall Master Oxygen's visit to Green Land in company with the black slave Carbon, do you not? Well, of course, they were invisible being wrapped up in yellow sun-beams. You recollect how the plants rejected the lively Oxygen and how he flew off in a fit of sulks. This naturally left the entire field free to wily Carbon just as he wished it.

But he could never have succeeded in his clever trick had not the smiling sun-beams helped him among the plants; for, undoubtedly, they would all have been sadly frightened at his ugly, black face, were it not veiled in thick golden sun-beams.

Not only that, but these sun-rays glared so fiercely at Master Oxygen as he stood there close

beside Carbon, that they, too, helped to send him a-flying as I have said before.

With the aid of these helpful little creatures, sly Carbon was soon enabled to wind himself about the very hearts of his plant friends; finally becoming, as it were, an actual part of their very root, limbs, and tissue.

This was perhaps more than the gay Sun Elves or even Carbon himself had bargained for; but alas! too late did they find themselves locked up, deep, in the heart of Plant Land; whose green folk seem to take it for granted, that their airy visitors had become one with themselves.

Slowly the time passed in that Plant Land. The tall tree ferns bent low their aged heads; The frisky young horsetails, and waving reeds wore out in turn; and finally the whole green forest sank down to sleep, while the waves from the sea near by rolled over it gently, covering it with a thick blanket of printing sand.

In due time this sand blanket was turned into heavy rock, by being pressed upon from above, and by the heat produced by such pressure.

How do you think sleeping Plant Land fared down below? What could be expected from all that pressing and baking in such an oven! Burned to a black crisp, pressed completely out of shape and color; there they lay, a seemingly dead, black, shapeless mass as an ocean of time rolled slowly on.

None left in pretty Green Land excepting that shrewd rascal, swarthy Carbon. Even the bright, golden Sun Elves had vanished. Now it happened one day, that this land which had so strangely sunk ages before, was mysteriously raised up again, and through a crack in the surface, black Carbon, the unquenchable, beheld the welcome light of day once more.

But the golden Sun Beams, where were they? And there came by a strange creature who broke off a piece of the queer black stuff, throwing it down carelessly soon after into the fire-flame.

And lo! the strange, black stuff became alive with light and heat. Behold! the glancing, dancing Sun Elves set free at last after thousands, yes indeed, thousands of waiting years.

So that hard, black stuff called "coal" is really "nothing but leaves," pressed, baked, sun-filled leaves preserved in Carbon.

Questions suggested by the text:—1. What proof have we that coal is but the remains of by-gone plants? 2. What is peat? 3. What is meant by the expression "carrying coals to Newcastle?" 4. How was the use of the coal of our country accidentally found out? 5. Have you heard anything about "natural gas?"

TALK XXIV.

A LONG RUN.

WHO do you suppose were ready for it? None other than the harum-scarum downward-pelting Water Kelpies. You recollect how anxious they were to get down to earth; but of course such giddy things never dreamed of being stopped short at any stage of their journey.

That is precisely what happened to them, however. Some fell upon the heaving bosom of the singing river, and eagerly joined it on its glad road to the sea; while other more unfortunate little Kelpies fell upon the dry Earth who embraced them so warmly, that, ere they were aware, they found themselves sunk down beneath the surface. What to do in such close quarters was more than they could tell.

Their first natural impulse was to get out; now the only way out, was to go through; as the road was sandy, and they could easily slip in between the tiny specks of sand. So down they went, as through a sieve, soon finding themselves on a closely packed clay-bed.

Here was a bad fix! Go through, they could

not ; so they were compelled to creep along at a snail's pace, finally landing, down at the lower end, on a hard rock. One pair of bright eyes spied a crack in the rock, so on they went right through the crack ; then they found another, and another.

For a while all went well as far as cracks or roads were concerned ; but at last there came an end to these, and the poor, tired-out little runaways became impatient and discouraged. It was a real cold night.

They huddled together, then stretched out and went to sleep. Now what do you think happened while they slept ?

When these little Kelpies grow ice-cold, they require more room, and so, as I said, they stretched out, and so hard did they stretch that they actually made a pretty good-sized crack in that hard, unyielding rock. Now a crack was a highway for them.

So they plucked up courage and went on once more, spying out the cracks, hurrying through the sand-sieves, crawling along clay-beds, even breaking open a road-crack by freezing and stretching ; now down, down, then pushed upward, if the crack happened to be there, by those behind ; until finally one day they found themselves pushed to the surface, where they saw glad daylight once more.

How they did bubble up for joy ! And the

pretty, purple violets, that fringed the newly-formed, crystal bowl, nodded their shy heads as if glad to see them, while Robin Redbreast with timid Jennie Wren flew down to sample the inviting contents, loudly chirping meantime their approval; which interesting scene was rudely interrupted by, "Hallo Tom! come on! I've found a new spring, clear as crystal, cold as ice."

Questions suggested by the text:—1. Why cannot water penetrate clay? 2. How does water circulate under ground? 3. A tub of water placed in a cold room containing plants will sometimes prevent them from freezing on a severe night. Can you think of the reason? 4. A glass of water frozen to ice, becomes cracked, why? 5. What can you find out about "Artesian wells?"

TALK XXV.

WEE PLOW-MEN.

OH! I know you are curious to see them, but you need not look for them in the fields. They live over the fields, under the fields, yet never in the fields; nevertheless they plow them quite thoroughly. There is a conundrum for you! Let us try to puzzle it out.

First of all comes Master Oxygen. He must have a part in every thing agoing, so of course, he must help plow, just for the fun of the thing, I suppose. He, in company with the wild chasing Water Kelpies, falls on to the rocks in the field and eats his way, or plows it if you prefer to say that, right and left over the surface, leaving a crust-track which, when it is yellow, folks call "rust."

Then there is a lusty, old fellow who is apt to make things lively with his "tchick!" That is Jack Frost, sharp old rascal he! How he does love to bite our fingers, blue our noses and pinch our ears! Well, but what has that to do with plowing the fields? Why, just this, he is looking for his

dear little friends, the Water Kelpies imprisoned in the soil more or less deep.

He gives a quiet little “tchick,” perhaps, to let the small prisoners know he has found them; breathing his cold breath upon them, thus causing crack after crack in the rock deep down, while pushing apart the tiny particles of soil near the surface, so hard, on either side, that the ground is pretty well plowed up. Quite a help to the farmer, is it not?

I have yet to tell you of the strangest, the steadiest little workmen of all. You know, boys, those wriggling, squirming earth-worms that you dig up for bait, and the girls scream at if one happens to touch them? They are, perhaps, the mightiest plow-men of the world. Day in, day out; year in year out; they plow beneath the surface; mixing the soil, loosening the soil, bringing up the good part from below to take the place of the worn out soil above. For the strength or goodness of the soil is being continually used up as food for the plants, so naturally if the soil were not renewed, it could not supply the necessary nourishment.

What a wonderful, wonderful work, those “nasty little worms” are doing for us all; actually making soil for the growth of plants which form our daily food.

Now do you not think this odd trio, Master Oxygen, Jack Frost, the Angle Worms, are all

skillful plow-men? Soil is nothing less than ground up rock. With the waters of the sea continually washing away the land ; we should soon be left to live on bare rock, were if not for our sturdy, hard-working delvers in the soil.

Questions suggested by the text :—1. What is rust? 2. Of what use is frost to the farmers? 3. What is meant by the bed rock? 4. What is soil really? 5. What are angle-worms good for besides bait?

TALK XXVI.

SILVER THREADS.

WHEN the freed Water Kelpies bubbled up for joy on reaching the surface, they suddenly bethought themselves of their long-lost comrades. Where on earth were they ?

In the midst of the gush of tongues that followed, some over-lively Kelpies just bubbled up over the rim of their basin-shaped cradle ; never stopping until they found themselves in a strange, new hollow far down the hill.

Here to their utmost surprise, they found quite a number of their watery kinsmen, who spoke of a similar imprisonment, and who expressed a wish to join them on their journey. Of course this new addition to the basin soon caused another overflow ; and off again went the merry, laughing crowd, down the hillside, being joined every little while by another welcome band.

“The more, the merrier,” laughed they all, as breathless by their long scamper they found themselves at the foot of the hill. “Now,” cried they, “we’ll have some room to stretch out in !” For a

wide plain spread its green length before their crystal eyes.

Would you believe it! there were so many of them, that they soon formed a broad silver thread running right through that green valley. On, on, they went, not only the continually freed prisoners from the hillside increasing their number; but also new cousins directly from the clouds above.

To be perfectly candid, one is compelled to speak of the mischief wrought by this cold water band. In their wild scamper down hill, they had sadly grazed its sides, tough though it were, carrying off great speck-heaps of ground-up rock on their transparent little backs.

On, on, they carried this earthy pack; for no time had they to stop and unload, even when they reached the plain. The end of their journey was not yet. Oh, no! as they turned themselves into a shining, silver band spreading far down the green valley in the bright sunshine; it was all too delightful to stop, even for a moment.

In fact they never dreamed of stopping, rather strove to drag everything they could grasp hold of with them on their merry, singing chase. Sometimes, when they found them in the way, they would bodily seize great, sleepy stones and pull them on in their mad course, dropping their unwilling company miles away from their native homes.

Can you imagine such a wild goose-chase to

have an end? "All things come to an end in this world," says staid Miss Wiseacre. Certainly, and it is apt to come rather suddenly to such as use no more foresight, than our scatter-brain little Kelpies. Lo! on one strange day their astonished eyes beheld a mighty, endless water-mass rear its giant, rocking arms to stop their further progress.

The wonder-stricken, little Kelpies stood still for once in their lives, their tiny earth-packs dropping all unconsciously from their helpless, dripping shoulders. Where in the world were they? This was stranger than the dark earth-prison!

Suddenly there came a low murmur from the rocking water-mass: "Little wanderers of the air and land, here alone is your true home, be at rest." Then appeared on the glistening crest of the mighty waves, countless numbers of their long-lost comrades rippling sweet a welcome home.

Really I must not forget to tell you a strange fact of that immense earth-pack so abruptly dropped and forgotten. Could you believe it possible for tiny creatures like them to be such enormous mud-carriers?

At the mouth of a river, where the current is checked by the inflowing sea-tide, the amount of earthy material spread out in a mud-fan, becomes in time wide enough and high enough to build up a state.

You remember the state about the mouth of our

Great Father of Waters; that is really a heavy deposit of the mighty working river and its helpers.

Questions suggested by the text:—1. What force carries a river to the sea? 2. By what force are its waters returned to the land again? 3. What feed rivers besides springs? 4. How do rivers alter the face of the earth? 5. How is a delta formed? 6. What have you heard of the sand bars of the Mississippi?

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TALK XXVII.

A PINCH OF SALT.

PRAY, what may a “pinch of salt” have to do with our story? Let us see! Do you know where salt comes from? Why, the sea, of course! Yes, but how does it get there? The waves do not churn salt, do they? Let us ask our late friends, the Water Kelpies.

Suppose we examine very closely their tiny sand-packs as they are about to enter the sea. We shall find salt in them.

You know that in their long journey under the land and over the land, they actually grind away the hardest of rock, carrying the grounds on with them. Now these rock-grounds often contain salt; so it is the Water Kelpies we have to thank for the salt in the sea. If this is really so, you stand ready to say why are not all rivers salt too?

Simply because running water does not stop long enough to lay down salt, sufficient to taste at least, on the river’s bed.

Almost all the salt-pack is carried until the sea is reached; and there it is laid down year after year. Now a great deal of the sea-water is drawn up again to the clouds by the sun’s heat; but the salt is always left behind; so you see what an

immense "pinch of salt" is being continually left in the sea.

What is the use of making such a fuss about salt? Have you ever tasted a piece of bread made with the salt forgotten? It was nice and white, with plenty of butter on it; but you did not want another piece like that, did you? I guess you rather like salt after all. Really, my little man, you or I could not live long without salt. Our bodies require it in order to grow. The instinct of animals leads them to travel miles to reach it. Have you ever seen a horse lick a stone? He likes the salty taste in it.

We all need it you see; so that is the reason why God has stored it up in that gigantic vat, the sea.

Johnny is interrupting, he says salt is sometimes found in mines,—and there is Dick chiming in. He has just come from Syracuse.

Out there he declares, people get salt from salt-wells in the ground.

You are both correct. Those places, however, were once, ages ago, under the sea which by-and-by rolled away leaving its great salt masses behind it.

Questions suggested by the text:—1. How do the rivers, fresh water, make the sea salt? 2. Why is the Great Salt Lake salt, not fresh like other lakes? 3. Some salt lakes dry up entirely in summer. What advantage is taken of this condition of things? 4. For what is Cracow noted? 5. What do you know of the salt wells of Syracuse? 6. Where do the people pump up sea water on branches and leave it to evaporate, thus obtaining their salt?

TALK XXVIII.

MUSTY CARPETS.

ON the broadest of Mother Earth's highways lives Viking Bold. He actually takes up, for himself and train, three times as much space as anyone else. He does not consider himself selfish either. He declares he has so much work to do, he requires just that amount of space to move about in; and to receive his endless stream of visitors, the silver-threaded bands of Water Kellies with their enormous sand-packs for instance, to say nothing of the untold numbers falling constantly from the clouds.

How could he accommodate them all so readily if he were cramped for room? One is sure to find a hearty welcome in his kingdom. No one is turned away. Yet Viking rules his realm with a rod of iron.

His eye is everywhere. Were one to take the wings of the morning, and fly to the uttermost ends of the earth, he would not escape Viking's rule.

The deepest hollows of the earth's crust has he made his home. If you were to set the tallest

mountain right in the midst of his kingdom it would sink down miles out of sight. Yes, yes, Viking Bold is a mighty king!

His watery palace is roofed over with the endless rush of many waters; and his floor is made rough with immense wrinkles or deep hollows just as we are accustomed to see on land.

What an immense amount of carpeting must be needed for such a gigantic structure. Of course, a king's palace does not show bare floors.

No, indeed! His Kingship has an untold number of workmen, laboring year in, year out, to cover the ugly bare rock-floor.

This carpeting was started countless ages ago; so that to-day there must be myriads of layers of musty, dusty carpeting one over the other.

First of all there are those everlasting little Water Kelpies, bringing in each day their mud-packs or sand-packs. The latter make uncommonly fine, soft carpets. So Viking has them laid down on many a mile of his upper floors.

Down in the lower stories, the carpet-weaving is down on the spot, by mere dots of animal-atoms who make a fine, white carpet of their tiny shell-specks.

Can you imagine where you may obtain a sample of this variety of carpet? Johnny has a piece of it in his hand. You cannot possibly mean "chalk?" That is precisely what I do mean.

That chalk came from a hill which once lay

deep in the sea, as a sort of thick carpet roil.
Then old Fire King, down beneath, gave it a hard
shake, and up it rose above the water, a gleaming
white chalk-hill.

Questions suggested by the text :—1. To what is the term “the sea” applied? 2. Where is the sea the shallowest? 3. What is the bottom of the sea commonly believed to be like? 4. How does the greatest depth of the sea compare with the height of the tallest mountain? 5. Do you know where the “Atlantic Cable” is laid? 6. Why was it placed there? 7. An old name for England was Albion. Why was it so called?

TALK XXIX.

THE LULLA BYS.

VIKING BOLD has the best ordered train of telegraph operators you could imagine. They never fail to make the proper connections, even though their message requires them to encircle the entire world. These long-distance messengers are creatures of the greatest importance, so we shall leave them to the last, to discuss them in a talk all by themselves.

The short-distance messengers are the ones we are best acquainted with. They are the tuneful Lulla Bys, forever singing while they rock to and fro. As they lie on the sea in their sparkling, silver robes, so attractive are they, it is not to be wondered at, that Air Queen's winged offspring, the Breezes, court their attention, causing the impulsive little creatures to rock to and fro in their excitement.

Indeed when Storm King, that Prince of Breezes, happens along, he pulls up the Lulla Bys into great water-hills; while their soft, low murmur becomes a wild roar. They never go far away from home however. They reside, you know, in

the top floor of Viking Belf's water-palace; and there they sing and are rocked by their never-failing companion, the Breezes.

But you must not think for an instant that these gay, playful creatures have nothing to do but to amuse themselves, gossiping with those lively air-children. Each little wave, as he is bent down, then up, gives a knock on the elbow of the next one; so that finally those on the water's edge are dashed hard upon the shore, shattering into fragments any rock in the way, and dragging back to sea with them, heaps of pieces for the long-distance messengers to carry to the other end of the world.

So you see the waves have quite an amount of work to do, tearing off ragged edges of the land in one place, and helping to patch up a hollow or scant piece in another.

Questions suggested by the text :—1. What part of the sea only is affected by the winds? 2. What is sand? 3. How do waves affect a rocky shore? 4. How are "dunes" formed? 5. Where are the waves the highest?

TALK XXX.

A WILD GOOSE-CHASE.

IT is the wildest chase imaginable, all along the broad highway of Viking Bold's domain, and reaching to the uttermost ends thereof. Who, do you suppose, starts it? Not his briny Kingship, he may be swift and bold in his stirring way; yet he never allows anything to run away with his cool head.

Enchanting Luna, the silvery Queen of Night, works her magic spell on the murmuring wavelets beneath her attractive light, luring them upward toward her sweet wooing face. Nearer yet nearer they strive to pile themselves upward, actually leaving a deep hollow of water afar off, by their continual drawing from that store.

Now these two vast waves endlessly chase each other over the sea, lured onward, ever onward, by the mocking smile of attractive Luna. Would you believe so lovely, gentle a creature to be capable of setting folks off on such a wild goose-chase?

The instant these poor bewitched wave-rolls think they have piled themselves to their greatest

curving height, Luna has quietly slipped on just a little ahead ; down they begin to fall with discouragement, and to cap the climax some island, coral reef, or continent elbow comes right in their way to stop their hurried chase.

In spite of all this they go on, these great waves, one after another ; now rising directly under Luna's smile, robbing those behind them of their watery store to make their own higher. Over the great Ocean highway they hasten, ending their journey only to begin anew the ceaseless chase ; while Luna, serene, continues to attract them by her wooing glance.

The real truth of the matter is, that not only the mad waves, but old Mother Earth herself, is attracted by this silver-faced stranger in the skies. The rising waters actually pull Dame Earth after them in their flight ; so much so, that she leaves, as it were, a sort of hollow over on the other side and the waters behind rush in there, making another water-hill just as high as the harum-scarum upstarts on the side directly under the moon.

People often call this great heaping-up of the waters "flood tide" and the hollows in between "ebb tide." Now these great tide-waves occur regularly twice in twenty-four hours, starting an hour later each day. So in olden times, when most folks had not other time-pieces, they used to mark the time by this ever-lasting water-chase

which they called "tide," their English for "time."

Questions suggested by the text:—1. By what means are the waters of the sea circulated from one end of the earth to the other? 2. What chiefly is supposed to cause tides? 3. In the Mediterranean there is little or no tide. Why? 4. What place is famous for its high tides? 5. A very high tidal wave entering the mouth of a river, sometimes moves upward in its channel as a vertical wall of water. What is such a tidal wave called? 6. Do you know where this happened not long since causing great destruction to life and property?

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TALK XXXI.

BLACK AND BLUE.

BLACK and Blue are rather suggestive titles—
are they not? Let me put matters straight
on this point first. These names are given their
owners on account of the usual color of their
garb, not because of a close acquaintance with a
cat-o'-nine-tails.

Ah, no! they are too diligent to require any
such sharp reminder. Viking Bold understood
what he was about, when he made them his chief
long-distance messengers.

You see his briny old Kingship, having an
extremely restless region to rule, is compelled to
adjust matters very prudently; else things would
get into a serious snarl. In one part of his realm,
the watery sprites are apt to get into a great heat,
because they lie continually exposed to the fiercest
of King Sol's rays.

While this state of excitement occurs about in
the middle of Sea King's domains, at the further
ends, where King Sol does not shine with such
force, things are inclined to be exceedingly dull
and cold. For these reasons, Viking has estab-

lished a train of messengers extending from one end of his kingdom to the other.

The over-heated stream he dispatches to the far distant cool regions, where the surplus heat is eagerly welcomed; while the cold home guard, pushed out of place by the warm-hearted strangers, set off on a track that finally brings them into the warm balmy region, in which their cool touch is gladly welcomed in its turn. So this is the way, you see, shrewd Sea King keeps peace throughout his watery realm.

Let us follow the great heat messenger, Blue Flow, on his long journey. Starting from the centre, the very warmest nook, he, with his immense train, is not very noticeable until he has gone some distance; when coming out of a crook in the sea, he appears in a beautiful, indigo-blue coat.

Very proud of his good looks, he flows gayly on, on, or rather upward when he suddenly finds himself checked by an icy-fingered stream coming down from the opposite direction.

A great fuss takes place, resulting in whole banks of fog; then Blue Flow, in disgust, turns off to the right, and flows on for a long distance in two great trains, breathing warm, moist breaths upon the neighboring shores, which blossom fresh and green under such genial warmth.

What a grand work this Blue Flow does, the greatest of sea-rivers! He is a thousand times

larger than the largest land-river. Just think of that. Yet he too has an end. Flowing on, on, with his beneficent store of heat; he finally loses himself off in those cold streams, so ready for his gracious company, up at the frozen ends of the world.

What Blue Flow does for one side of Sea King's realm, Black Stream does for the other. He, too, starting from the same warm nest, flows onward as water-carrier and heat-bearer to the far North; turning with a big sweep when he thinks he has gone far enough, and coming back home on a new track to the right.

The mild, blossoming lands in his wake are witness of his generous gifts of heat and moisture.

Questions suggested by the text:—1. What do you know about rivers in the sea? 2. The British Isles lie as far north as Labrador; why have the former a much milder climate? 3. What is the cause of the mild climate of California? 4. What causes the waters of the sea to flow off in currents? 5. What good work is done by currents?

TALK XXXII.

LIFE IN GREEN LAND.

WHERE, where is Green Land? Far away in the Arctic Seas to be sure! How could a Green Land flourish in such a spot? Any one who would call land there, green, was joking. He undoubtedly meant ice-land.

Our radiant, blossoming Green Land is all about us, right close by. Oh, you mean the plants, I suppose! Whom else could I mean, pray? Is not the home of green things naturally a green land?

How wags the world in Green Land? It is the most wonderful spot in this respect at least. No one shirks his work. I am inclined to believe that all work is considered play. For the instant the folk have no work to do, they die. They actually cannot endure to live without something to do.

So life in Green Land means work or play, if you have a mind to call it by that name.

What a wonderfully unselfish labor is theirs, if they only knew it; working each minute of their lives for others, for you and for me. If we were to start talking of the manifold supply of food

provided by their untiring efforts, we should be compelled to talk on until Christmas I guess.

Indeed we could not draw a single breath, with comfort or safety, without our plant neighbors to assist us. Let us see how that is.

Plants, through their leafy lungs, pick the air to pieces while the sun shines on them. This air, you are aware, is largely a mixture of oxygen and carbon. The plants reject the oxygen, using the carbon to build up their fresh, green bodies in beauty and in strength.

We have already learned how welcome, yea how necessary, oxygen is to the life of an animal. How greedily he breathes in the oxygen-laden air! But quickly this life-giving product is changed in the body, by its union with the waste matter there.

This compound is called carbonic acid gas, and must be gotten rid of rapidly or it will poison life. The lungs breathe it out, spoiling the air by so doing.

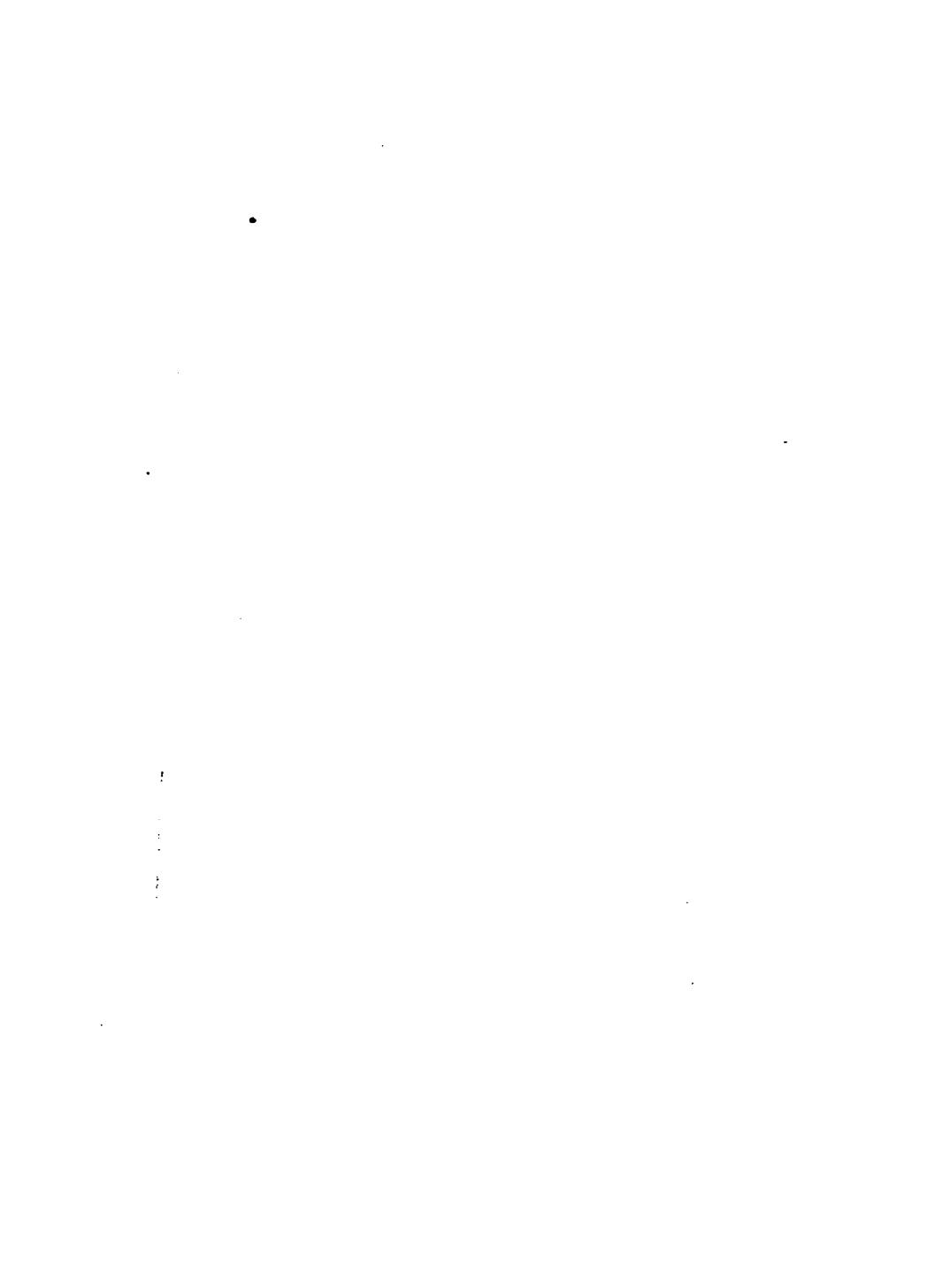
Just think, how many animals and human beings are spoiling the good air each second! Now this air is not fit for us to breathe again. We have poisoned it. Something must be done, else we die.

Green Land sets to work. The leafy lungs absorb, through their countless pores, this dangerous mixture, and just tear it into pieces, picking out the carbon to grow fat on; at the same time set-

ting loose the oxygen to fly back into the air, so making it pure and wholesome for our breathing.

We can hardly thank our beneficent green neighbors sufficiently for such noble work.

Questions suggested by the text:—1. What is it that makes things burn? 2. Why do people place a lighted candle in a room to test the air in it? 3. If you shut all windows and doors to keep out the night air, what air do you then breathe? 4. What two elements, good in themselves, form in our lungs the poisonous compound called carbonic acid gas? 5. What prevents this compound from accumulating, to such a degree, in the atmosphere, as to cause death to all animals?







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